REMARKS/ARGUMENTS

This paper is being submitted in response to the Office Action dated November 18, 2008. At that time claims 1-24 were pending in the application. Claims 9-24 have been withdrawn pursuant to a restriction requirement. Claims 1-8 are presently under examination.

In the Office Action, claims 1-8 were rejected under 35 U.S.C. §103(a) over Shepherd, et al. (United States Patent No. 4,155,394). In addition, it was suggested that Figures 1a and 1b be designated "Prior Art." Accordingly, a replacement sheet is being submitted herewith.

Based on the remarks below, claims 1-8 are presented for reconsideration and allowance by the Examiner.

Rejections under 35 U.S.C. §103(a)

"[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a prima facie case of unpatentability." *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). M.P.E.P. § 2141 sets forth the *Graham* factual enquiries that should be considered when making an obviousness rejection under Section 103: 1) ascertaining the scope and content of the prior art; 2) ascertaining the differences between the claimed invention and the prior art; and 3) resolving the level of ordinary skill in the pertinent art. (Citing *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966).) In addition, M.P.E.P. §§ 2141 and 2142 set forth that "the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit." (Citing *KSR International Co. v. Teleflex Inc. (KSR)*, 550 U.S. ___, 82 USPQ2d 1385 (2007).) In this case, the analysis clearly indicates that the claims as pending would not have been obvious over the Shepherd reference.

Fundamentally, Shepherd does not disclose a composite material having a negative effective Poisson's ratio. Importantly, it is not an objective of Shepherd to provide a cord composite that exhibits a negative Poisson's ratio in accordance with the subject invention. In contrast, Shepherd is directed to a composite tire reinforcement in which the composite comprises relatively low modulus nylon and/or polyester yarns cabled together with a 'stretchable' (twisted) aromatic polyamide (aramid).

As stated at column 1, line 35 to 46 of Shepherd, it is a first objective for the tire reinforcement composite to be extensible/stretchable. Shepherd further states that it is advantageous for the reinforcement cord to have a substantially greater modulus and breaking strength than is ordinarily obtainable from simply cabling nylon and polyester yarns together referring to column 1, line 64 to column 2, line 6. This is achieved by incorporating aramid yarns within the cabling.

Referring to column 2, line 7 to 16 and particularly column 2 line 41 to column 3, line 3 the aramid yarns are themselves twisted so as to effectively reduce their modulus towards that of the nylon or polyester yarns. This twisting introduces the ability of the aramid to stretch when placed under tensile load. According to column 2, lines 7 to 11, the physical/mechanical properties of the tire reinforcement are optimized to be i) extensible or stretchable (via the nylon/polyester yarns and the twisted aramid yarns) whilst ii) being resistant to breakage at full extension (of the nylon/polyester yarns) due to the incorporation of the aramid yarns. This is confirmed at column 2, line 34 to 40 where Shepherd states that in accordance with the invention, upon application of a longitudinal stress the primary load bearing ply is the polyester or nylon yarns and that following '*appreciable elongation of the cable*' the primary load bearing yarn is the aramid yarn.

Fundamentally, the composite reinforcement cord of Shepherd is configured to elongate or stretch in response to application of a tensile load with the aramid yarns decreasing the likelihood of breakage at maximum extension. This is achieved, in part, by optimizing the extent of twist applied to the individual yarns which are then helically cabled together.

As clearly illustrated in figures 1A to 1C of Shepherd, the twisting and cabling of the yarns results in an overall decrease in the thickness of the cable (as the yarns stretch/elongate) in response to the tensile load. As will be appreciated, the unloaded and twisted yarns of figure 1A have a greater diameter than the corresponding stretched yarns of figure 1C. As each individual yarn has a positive Poisson's ratio (not least because of the pre-applied twisting and the resultant configuration to stretch) the composite cord also exhibits a positive Poisson's ratio.

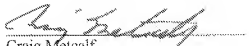
The present invention when placed under load, due to its very structure, is configured to provide the auxetic effect immediately as a result of straightening of the first component which in turn increases the diameter of the helix of the second component. As detailed in the specification as filed, page 1, last paragraph to page 2 second paragraph the subject invention is configured to cause variation of the radial position of the second component relative to the axis in response to variation in the load on the first component or alternatively to cause the diameter of the second component helix to increase as the first component helix decreases in diameter in response to a tensile load. The converse is true when the composite component is subject to compressive forces.

In contrast, the individual yarn strands of Shepherd are twisted and specifically configured to elongate (and hence become thinner) when placed under load. The skilled person would find no motivation from Shepherd to configure the yarns and/or composite structure to expand or contract perpendicular to the axis of the applied loading force.

For example and referring to figures 1A to 1C, the skilled person is directed away from the subject invention as compression along the axis of the cord of figure 1A would clearly not result in a reduction in the diameter of the assembled cord for the reasons given above. The skilled person is further directed away from the subject invention as clearly the cord diameter decreases from figure 1A to figure 1C under the application of tensile load. The skilled person would be required to make significant structural modifications to the individual yarns and the composite structure so as to effectively reverse the Poisson's ratio of the composite structure from positive to negative.

For these reasons the claims as presented are in condition for immediate allowance. If there are any remaining issues preventing allowance of the pending claims that may be clarified by telephone, the Examiner is requested to call the undersigned.

Respectfully submitted,



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